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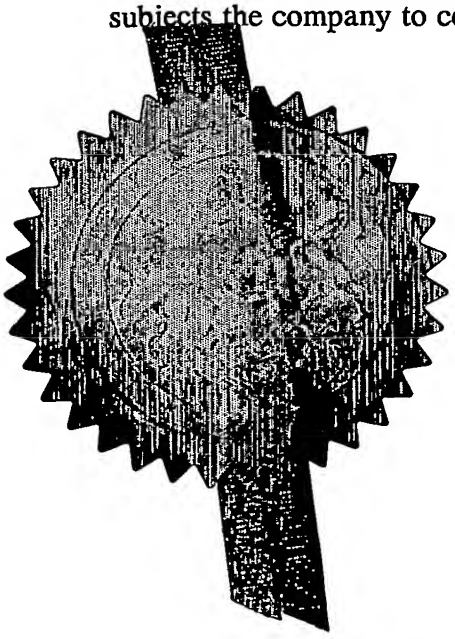
I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.



Signed Stephen Hordley

Dated 17 November 2004

Patents Form 1/77

Patents Act 1977
(Rule 16)

THE PATENT OFFICE
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The Patent Office

10NOV03 E850818-1 002973
P01/7700 0.00-0326147.6

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road
Newport
South Wales
NP9 1RH

1. Your reference — NPS/P104214GB — 0403362-7

2. Patent application number *(The Patent Office will fill in this part)* — 0326147.6

3. Full name, address and postcode of the or of each applicant *(underline all surnames)* — The Engineering Business Limited
Broomhaugh House
Riding Mill
Northumberland
NE44 6EG

Patents ADP number *(if you know it)* — 76888800 1

If the applicant is a corporate body, give the country/state of its incorporation — GB

4. Title of the invention — Access System to and from Offshore Structures and Vessels

5. Name of your agent *(if you have one)* — Harrison Goddard Foote

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)* — Belgrave Hall
Belgrave Street
Leeds
LS2 8DD

Patents ADP number *(if you know it)* — ~~14571001~~ 76313100 2

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing *(day / month / year)*

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if*
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d)) — Yes

Patents Form 1/77

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form	
Description	3
Claim(s)	
Abstract	
Drawing(s)	5 only

10. If you are also filing any of the following, state how many against each item.

Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	Fee Sheet

11. I/We request the grant of a patent on the basis of this application.

Signature Date 10th November 2003

12. Name and daytime telephone number of person to contact in the United Kingdom Nigel Paul Sanderson 0113 233 0100

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

a) If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.

b) Write your answers in capital letters using black ink or you may type them.

c) If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.

d) If you have answered 'Yes' Patents Form 7/77 will need to be filed.

e) Once you have filled in the form you must remember to sign and date it.

f) For details of the fee and ways to pay please contact the Patent Office.

WindBridge

Access system to and from Offshore Structures and Vessels

Introduction

Access to and from offshore structures and floating vessels can be seriously affected by vessel motion as a result of wave action. These movements are often unpredictable and result in significant risk when transferring personnel or equipment. Examples are the transfer of ship's pilots from a small vessel to a large one, and the access of maintenance and commissioning staff to an offshore wind turbine. It is common for vessels to be brought together or against the fixed structure and for people to jump from one to another. In rough wave conditions these operations can be very dangerous.

This document outlines an apparatus to provide a safe method of access between vessels or between a vessel and a fixed structure. This method uses tensioned rope(s) and air inflated members to form a supported a protected walkway and allows the vessel considerable freedom of movement when maintaining station. An additional advantage is that if a failure occurs the device falls into the water and will float and provide a safe refuge until a rescue can be undertaken.

Prior Art

Currently the transfer from vessel to vessel or vessel to structure is often achieved via a "Pilots Ladder" (A flexible rope ladder up the side of the vessel) or a fixed gangway or ladder attached to the structure.

UK patent application GB 2009686 describes an elastic vertical access system allowing the ladder to remain attached and in contact with the transfer vessel at all times.

Several systems are provided for the evacuation of a vessel or structure in the marine environment. Some of the systems can be reversed to permit personnel to move back onto the vessel or structure

Problems of the prior art

To access the bottom of the ladder the transfer vessel must come into close proximity with the bottom of the ladder and personnel step across onto the ladder. If this transfer is being undertaken in conditions with significant wave action the vessels may be moving up and down. In addition relative horizontal movements can cause the two vessels to move apart and come together increasing the likelihood of missing the step and falling into the water where the possibility of then becoming trapped or crushed.

The elastic system is designed with 15% extension and this may not provide sufficient movement if the ladder is short or transfer is attempted in more extreme wave conditions.

In the event of component failure in any flexible or portable ladder systems there is a very strong likelihood of the personnel or equipment ending up in the water with consequent increased risk of injury or loss.

Vessel emergency escape systems are often mounted on each structure or vessel to be accessed. In the case of a wind turbine access this would be prohibitively expensive, as there are many sites that must be accessed. A system that can be installed on the transfer vessel and used in many locations would provide significant cost savings. It is also likely to have improved maintenance and reliability, as it is not permanently stored in the marine environment.

The Invention

This invention provides a method and apparatus for the creation of a temporary bridge that can join two vessels at sea, or a vessel and a fixed offshore structure over which personnel and or equipment can be safely moved.

One embodiment of the invention, the access onto and off an offshore wind turbine structure is described below. (Numbers refer to numbers in attached figures):-

- The transfer vessel arrives at the turbine. At least one but most likely two or more wires are attached to the turbine mast well above wave crest height. (1)
- These wires are attached to winches possibly fitted with constant tension features to limit the loads that can be applied to the wires. (2)
- The boat moves to a suitable position just away from the turbine mast. The vessel thrusts away from the mast and is restrained by the tension in the wires. (3)
- The bridge is probably located on deck between or under the guide wire(s) although a turbine mounted bridge is possible. The sides of the bridge are fitted with attachment rings or couplings through which the guide wire(s) pass. (4)
- Alternatively a single rope is established and bridge hangs underneath. (7)
- The bridge structure comprises of one or more tubes or sections that can have air pumped into them. The sections of the bridge are separate to ensure that damage to one section does not cause all the air to escape stopping the safe operation of the system. (5)
- A suitable air pump or stored air at pressure inflates the bridge. Inflation causes the bridge to extend pushing itself up the guide wires from the vessel until it is in contact with the side of the wind turbine mast. (6)
- The bridge is secured to the guide ropes to tension the bridge against the mast.
- At this stage one end of the bridge is almost stationary against the wind turbine mast, the other is located on the vessel deck which is pitching, rolling and being moved back and forth by the action of the waves on the transfer vessel.

The bridge has sides and safety ropes that can be attached to safety harness of the personnel making the transfer before they leave the deck area of the transfer vessel.

Personnel step onto the bridge well within the deck area of the vessel. A slip or trip at this stage results in the person remaining on the transfer vessel deck.

Personnel move up the bridge until they arrive at the mast at which time they can step safely onto the ladder / access platform before unclipping from the bridge safety lines as there is no relative motion of the bridge and the structure at this end of the bridge.

The guide wires can be used to help maintain the transfer vessel in position relative to the turbine mast to ensure the vessel end of the bridge remains on the vessel. Also the vessel is being powered away from the mast, restrained by the guide wires. In the event that the wires are broken, the vessel will move away from the mast, reducing the risk of crushing.

In the event that the guide wire or wires are broken the bridge falls onto the surface of the sea where the air filled structure provides sufficient buoyancy to float. The resilience of the air filled tubes will also reduce the risk of injury to the personnel if they are on the bridge when it falls.

The bridge air-filled tubes are relatively soft and compliant reducing the risk of crushing injuries against the turbine mast or on the transfer vessel.

The bridge can be removed by allowing the air to escape retracting the bridge to the transfer vessel and removing it from the guide wire(s). The guide wire(s) are slackened and a spring release on the mast attachment activated, releasing the guide wires. The transfer vessel can then move away.

Alternatively the guide wires can be removed from the winches on the transfer vessel and the bridge remain in contact with the turbine mast. The transfer vessel can then move away picking up the end of the bridge when it returns. In this way the bridge may provide an emergency escape if the turbine mast needs to be evacuated when the transfer vessel is not on station in a similar way to an aircraft escape slide.

Uses

- The uses for the invention could include but not be limited to:-
- Access to and from wind turbines or other fixed structures at sea
- Transfer of pilots or other personnel to vessels at sea
- Access or transfer of personnel working on coastal structures such as sea walls, breakwaters etc.

Variations

- Use of non-inflated resilient walkway
- Allowing the vessel to hold a range of headings to suite weather conditions
- Inflated walkway is stiff enough to dispense with the need for wires to support it. It is then pushed against the other vessel or fixed structure.

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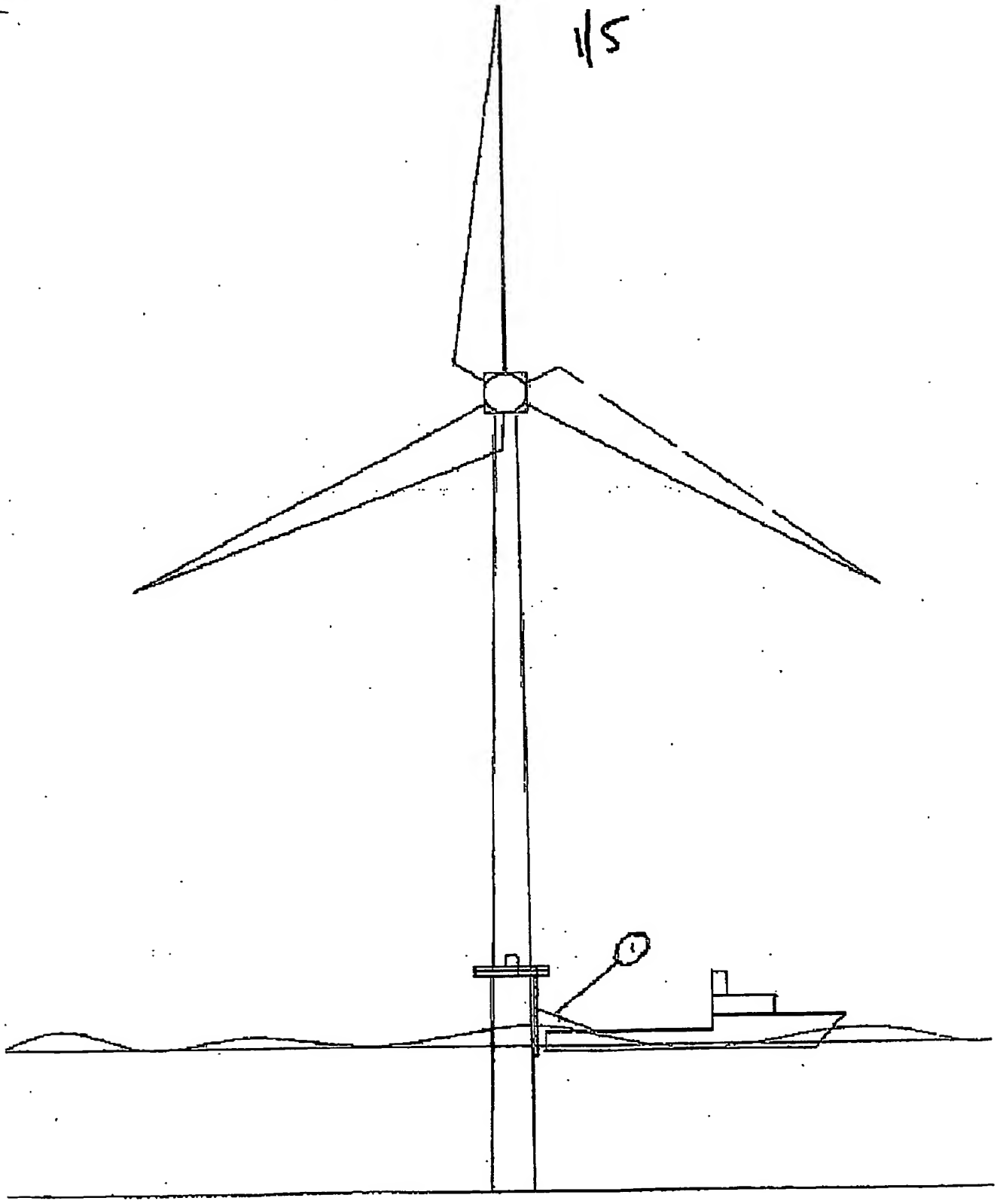

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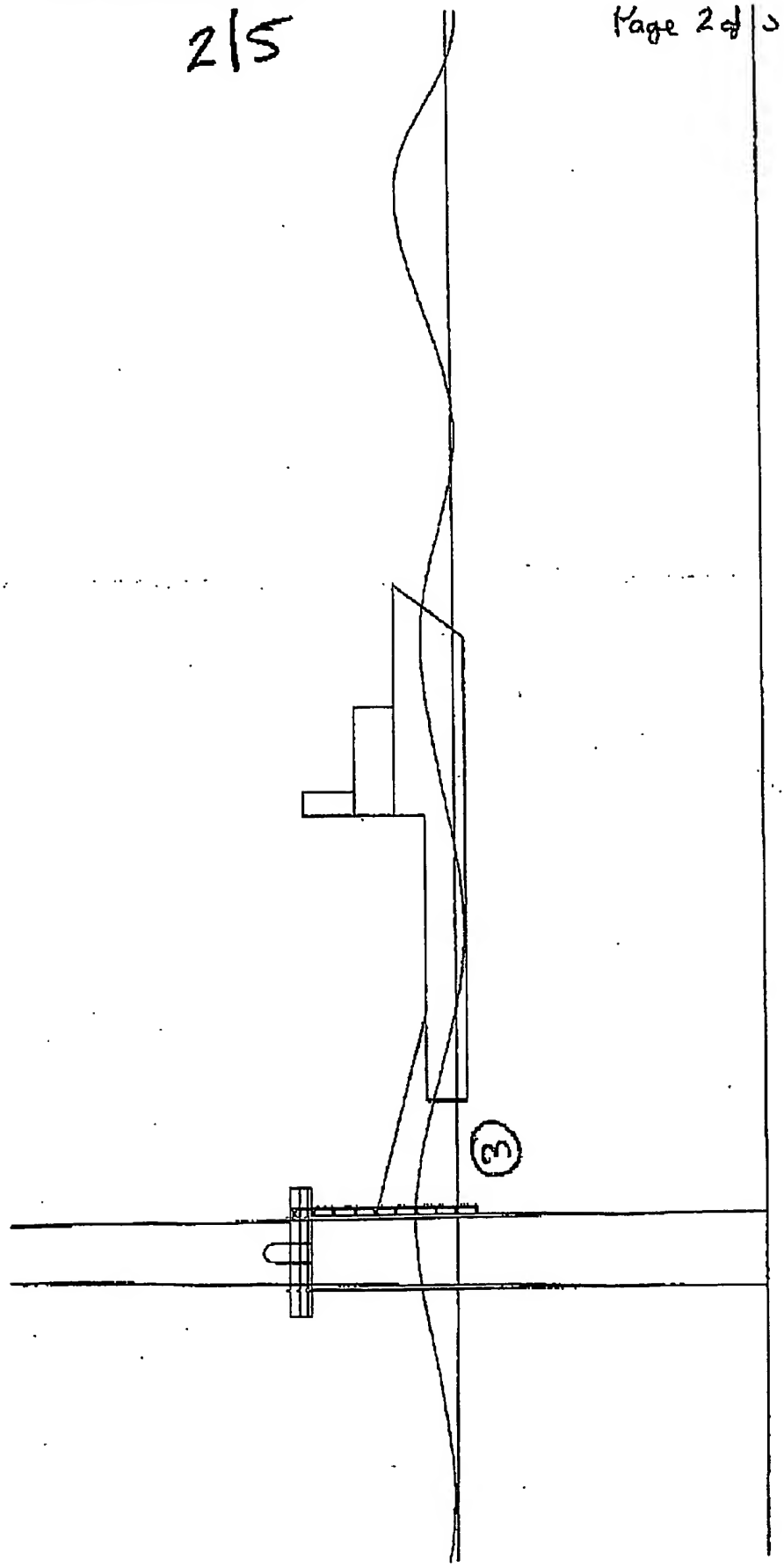

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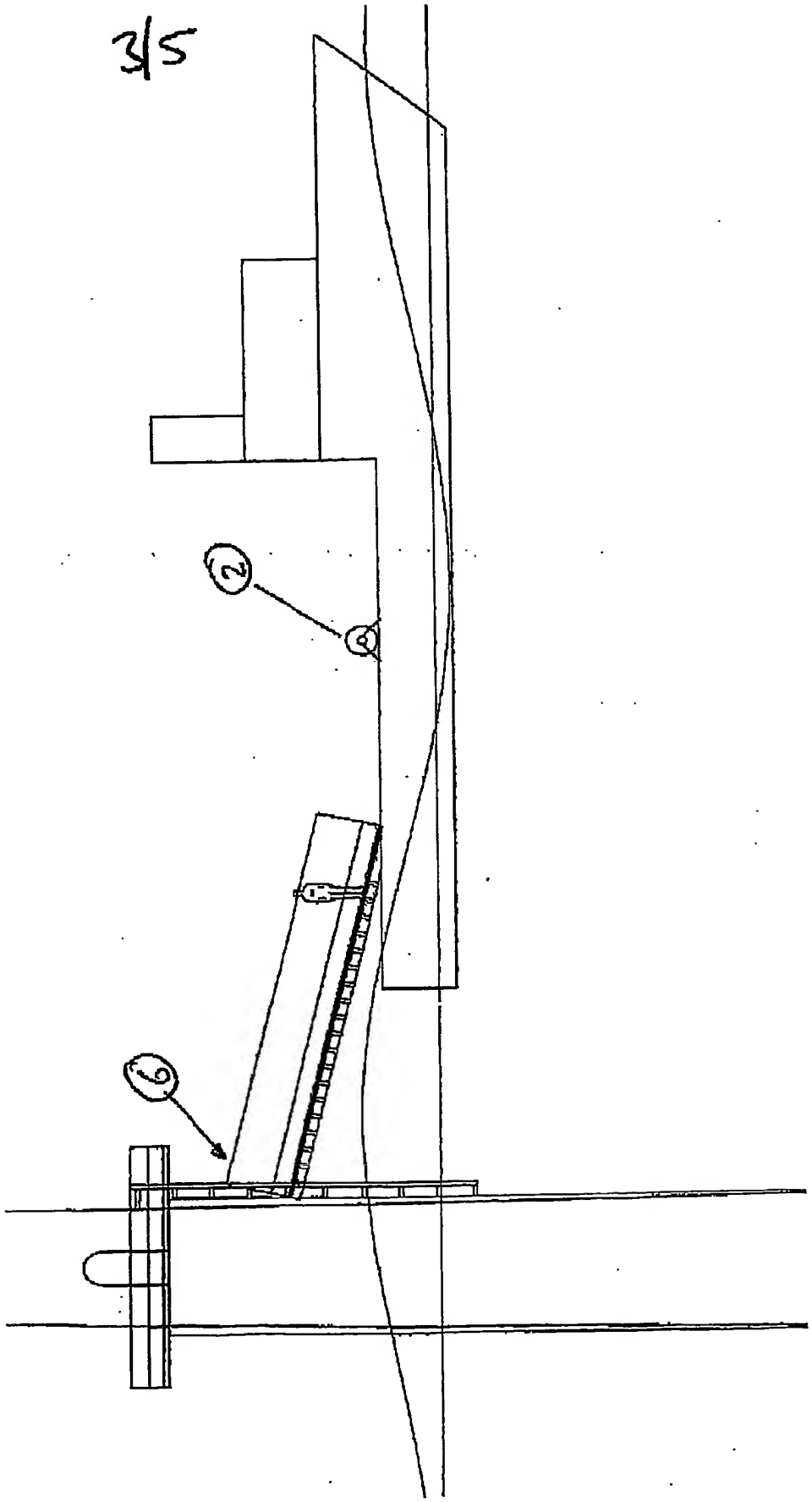

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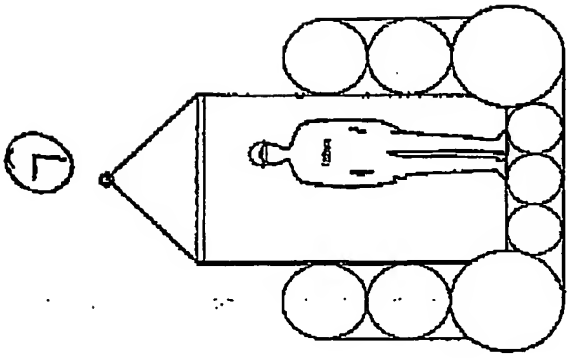

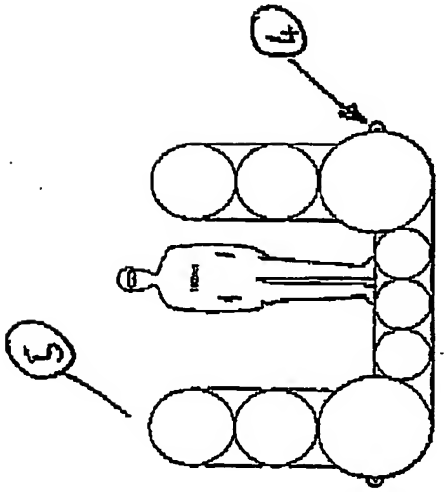

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